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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/519,775	12/29/2004	Nobuo Ishii	01165.0931	7307

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FINNEGAN, HENDERSON, FARABOW, GARRETT & DUNNER  
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WASHINGTON, DC 20001-4413

EXAMINER
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DHINGRA, RAKESH KUMAR

ART UNIT	PAPER NUMBER
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1792

MAIL DATE	DELIVERY MODE
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11/28/2007

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/519,775	<b>Applicant(s)</b> ISHII ET AL.	
	<b>Examiner</b> Rakesh K. Dhingra	<b>Art Unit</b> 1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 03 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 11 September 2007.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1,4-8 is/are pending in the application.
- 4a) Of the above claim(s) 6-8 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,4 and 5 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 December 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

***DETAILED ACTION***

***Claim Listing***

In terms of CFR 1.121, each amendment document that includes a change to an existing claim, cancellation of an existing claim or addition of a new claim, must include a complete listing of all claims ever presented, including the text of all pending and withdrawn claims, in the application. In this case, the amended list of claims dated 9/11/07 does not include the text of withdrawn claims 6-8.

Necessary correction to the claim list is required to be done.

***Response to Arguments***

Applicant's arguments with respect to claims 1-4, 8-16 and 18-24 have been considered but are moot in view of the new ground(s) of rejection as explained hereunder.

Applicant has amended claims 1, 4 (by adding limitations of claims 2, 3 to claim 1). Further, applicant has cancelled claims 2, 3.

Accordingly claims 1, 4 and 5 are now pending and active.

Applicant's argument that neither Matsumoto nor Smith, taken alone or in combination teach that if said plasma detection unit determines that no plasma is being generated, the adjustment signal output unit transmits an amount of adjustment, as an unmodified adjustment signal, is not found to be persuasive since Smith teaches photo-sensitive detector 128 that indicates plasma condition in the chamber, including existence of plasma, plasma of a particular chemistry or termination of plasma. Smith further teaches that data processor 134 with memory 136 (load matching device adjustment calculation unit + adjustment signal output unit),) can execute algorithms to transmit an amount of adjustment of the stubs 130, based upon the pre-determined impedance matching data already stored in the memory 136 and output from the plasma detection unit 138 for various plasma chemistries (that is, output from the adjustment signal output unit is modified as per plasma condition in the chamber). The output transmitted from the adjustment signal output unit regarding adjustment amount of the stubs would be modified (or

Art Unit: 1792

unmodified) based upon plasma condition in the chamber as per output from the plasma detection unit 138. It would be obvious to such an operation for the no plasma condition also. Thus Smith teaches this part of the claim limitation. Since Matsumoto in view of Smith teach all limitations of the claim, claim 1 and the dependent claims 4 and 5 have been rejected under 35 USC 103 (a) as explained below.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

**Claims 1, 4, 5 are rejected under 35 U.S.C. 103(a) as being anticipated by Matsumoto et al (JP 2001 – 320227) in view of Smith (US Patent No. 5,621,331).**

Regarding Claims 1, 5: Matsumoto et al teach a microwave plasma apparatus (Figure 1) comprising:

A processing chamber 1a, a microwave oscillator 20, an antenna 10a, a waveguide 21, a microwave adjustment machine 30 (load matching device), a directional coupler 35 (like a wave detector)

Art Unit: 1792

and a control section 34 (controller) for controlling the impedance matching between processing chamber 1a and the microwave oscillator 20 by calculation based on detection values given by directional coupler 35 (paragraphs 0056-0065).

Matsumoto et al teach a controller 34 that controls the impedance matching, but do not teach the controller comprises load matching device adjustment calculation unit, an adjustment signal output unit where that adjustment signal includes a calculated amount of adjustment multiplied by a predetermined value smaller than 1, and a plasma detection unit that detects generation of plasma in said processing chamber, configured such that if said plasma detection unit determines that no plasma is being generated, said adjustment signal output unit transmits an amount of adjustment, which said load matching device adjustment calculation unit has calculated, as an unmodified adjustment signal, or if said plasma detection unit determines that plasma is being generated, said adjustment signal output unit transmits as an adjustment signal indicating the amount of adjustment, which said load matching device adjustment calculation unit has calculated, multiplied by a pre-determined value smaller than 1.

Smith et al teach a plasma apparatus (Figures 1-3) comprising:

A chamber 110, a waveguide 122, an auto-tuner 102 that includes tuning stubs 130, processor 134 with memory 136 (load matching device adjustment calculation unit + adjustment signal output unit), sensors 132 and a spectrometer 140. Smith et al further teach that stub displacements are scaled (multiplied) by combining the stub displacement with a scaling factor (N) which may be a function of the magnitude of the reflection coefficient associated with the load. Smith et al also teach that scaling factor is typically less than 1. Smith et al additionally teach that process of load matching is continued till impedance of processing chamber matches the impedance of the microwave oscillator. Smith et al also teach a detector 138 that detects conditions in the chamber like formation of plasma (would include no plasma condition), termination of plasma or formation of a particular plasma chemistry, with the help of a spectrometer 140. Smith et al further teach that data processor 134 with memory 136 (load matching device adjustment calculation unit + adjustment signal output unit) can execute algorithms to transmit an

Art Unit: 1792

amount of adjustment of the stubs 130, based upon the pre-determined impedance matching data stored in the memory 136 and output from the plasma detection unit regarding plasma condition in the chamber that is modified as per plasma condition in the chamber. It would be obvious to such an operation for the no plasma condition also (for example, column 5, line 50 to column 7, line 35 and column 9, line 52 to column 10, line 68).

Therefore it would have been obvious to one of skills in the art at the time of the invention to use a controller that comprises a load matching device adjustment calculation unit for calculating an amount of adjustment to which said load matching device should be adjusted in order to match the impedance of said processing chamber with the impedance of said microwave oscillator; and an adjustment signal output unit for transmitting as an adjustment signal a calculated amount of adjustment multiplied by a predetermined value smaller than 1, on the basis of information given by a plasma detection unit that detects plasma condition in the chamber, as taught by Smith et al in the apparatus of Matsumoto et al to provide rapid matching of impedance of a non-linear load like plasma with the source impedance.

Regarding Claim 4: Smith et al teach apparatus includes processor 134, memory 136 and sensors 132 (adjustment detection unit) that detects adjustment position by which stubs 130 are adjusted and the auto-tuner 102 controller controls said stubs 130 according to a difference between the adjustment signal transmitted from said adjustment signal output unit and the signal of the adjustment position (column 7, line 45 to column 10, line 65).

### *Conclusion*

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing

Art Unit: 1792

date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rakesh K. Dhingra whose telephone number is (571)-272-5959. The examiner can normally be reached on 8:30 -6:00 (Monday - Friday).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on (571)-272-1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Rakesh K. Dhingra



Karla Moore  
Primary Examiner  
Art Unit 1792